

What is claimed is:

1           1. A driving apparatus for driving a fluorescent lamp using  
2   a high-frequency inverter method, the driving apparatus  
3   comprising:

4           a substrate that has a first main surface and a second  
5   main surface, each main surface including an electronic-device  
6   mountable area;

7           a choke coil that is mounted to the first main surface  
8   and is thermally connected to the substrate, the choke coil  
9   being a component of a high-frequency inverter; and

10          a switching device that is mounted to the second main  
11   surface, so as to be opposed to the choke coil with the substrate  
12   therebetween and to be thermally connected to the substrate,  
13   the switching device being a component of the high-frequency  
14   inverter and being positioned in a power-supply path to the  
15   fluorescent lamp.

1           2. The driving apparatus of Claim 1, wherein  
2           the switching device shuts down or restricts a power supply  
3   to the fluorescent lamp when a temperature of a main body of  
4   the switching device exceeds a heat resistance temperature,  
5   the main body receiving transmission of heat generated at the  
6   choke coil.

1           3. The driving apparatus of Claim 1, further comprising:

2 a rectifier circuit portion that includes a smoothing  
3 capacitor device, wherein

4 the smoothing capacitor device i) includes: a main body  
5 in substantially cylindrical shape; and a lead portion elongated  
6 from the smoothing capacitor device main body, and ii) is provided  
7 for the first main surface of the substrate, and

8 the smoothing capacitor device main body is provided  
9 either a) in a proximity of the choke coil with a gap of 4 mm  
10 or smaller therebetween, or b) in contact with the choke coil.

1 4. The driving apparatus of Claim 3,  
2 wherein

3 the smoothing capacitor device lead portion is processed  
4 to be bent to conform to the outer surface of the choke coil,  
5 and

6 the heat generated at the choke coil is transmitted to  
7 the smoothing capacitor device main body via the smoothing  
8 capacitor device lead portion.

1 5. The driving apparatus of Claim 1, wherein

2 a plurality of electronic devices, different from the choke  
3 coil, are mounted to the first main surface of the substrate  
4 by insertion mounting method,

5 at least one of the electronic devices is provided to have  
6 an angle in a range larger than 0 degree and smaller than 90

7 degrees, with respect to a mounting orientation of the choke  
8 coil, and

9 a lead portion of the electronic device having the angle  
10 is processed to be bent towards a center of the first main surface.

1 6. The driving apparatus of Claim 1, wherein  
2 the fluorescent lamp includes an arc tube that has a  
3 double-spiral discharge path.

1 7. A compact self-ballasted fluorescent lamp comprising:  
2 an arc tube that has a double-spiral discharge path, and  
3 electrodes provided at both ends of the discharge path; and  
4 a lighting-apparatus unit that supplies power to the  
5 electrodes of the arc tube, and drives the arc tube using a  
6 high-frequency inverter method, the lighting-apparatus unit  
7 including: a substrate that has a first main surface and a second  
8 main surface, each main surface including an electronic-device  
9 mountable area; a choke coil that is mounted to the first main  
10 surface and is thermally connected to the substrate, the choke  
11 coil being a component of a high-frequency inverter; and a  
12 switching device that is mounted to the second main surface,  
13 so as to be opposed to the choke coil with the substrate  
14 therebetween and to be thermally connected to the substrate,  
15 the switching device being a component of the high-frequency  
16 inverter and being positioned in a power-supply path to the

17 fluorescent lamp.

1           8. The compact self-ballasted fluorescent lamp of Claim  
2 7, wherein

3           the switching device shuts down or restricts the power  
4 supply when a temperature of a main body of the switching device  
5 exceeds a heat resistance temperature, the main body receiving  
6 transmission of heat generated at the choke coil.

1           9. The compact self-ballasted fluorescent lamp of Claim  
2 7, wherein

3           the lighting-apparatus unit includes a rectifier circuit  
4 portion that includes a smoothing capacitor device,

5           the smoothing capacitor device i) includes: a main body  
6 in substantially cylindrical shape; and a lead portion elongated  
7 from the smoothing capacitor device main body, and ii) is provided  
8 for the first main surface of the substrate, and

9           the smoothing capacitor device main body is provided  
10 either a) in a proximity of the choke coil with a gap of 4 mm  
11 or smaller therebetween, or b) in contact with the choke coil.

1           10. The compact self-ballasted fluorescent lamp of Claim  
2 9, wherein

3           the smoothing capacitor device lead portion is processed  
4 to be bent to conform to the outer surface of the choke coil,

5 and

6 the heat generated at the choke coil is transmitted to  
7 the smoothing capacitor device main body via the smoothing  
8 capacitor device lead portion.

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1 11. The compact self-ballasted fluorescent lamp of Claim  
2 7, wherein

3 a plurality of electronic devices, different from the choke  
4 coil, are mounted to the first main surface of the substrate  
5 by insertion mounting method,

6 at least one of the electronic devices is provided to have  
7 an angle in a range larger than 0 degree and smaller than 90  
8 degrees, with respect to a mounting orientation of the choke  
9 coil, and

10 a lead portion of the electronic device having the angle  
11 is processed to be bent towards a center of the first main surface.

1 12. The compact self-ballasted fluorescent lamp of Claim  
2 7, wherein

3 the both ends of the arc tube is stored in a case together  
4 with the lighting-apparatus unit.